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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,726	03/31/2004	Jesse Lipson	7360-002	9869
4678 7590 09/23/2008 MACCORD MASON PLLC 300 N. GREENE STREET, SUITE 1600 P. O. BOX 2974 GREENSBORO, NC 27402				
EXAMINER				
ZIA, SYED				
ART UNIT		PAPER NUMBER		
2131				
MAIL DATE		DELIVERY MODE		
09/23/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/814,726

**Applicant(s)**

LIPSON, JESSE

**Examiner**

SYED ZIA

**Art Unit**

2131

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date 03/04
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This office action is in response to application filed on March 31, 2004. Original application contained Claims 1-39. Therefore, presently pending claims are 1-39.

#### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-39 are rejected under 35 U.S.C. 101 as directed to non-statutory subject matter of software, per se. The claim lacks the necessary physical articles or objects to constitute a machine or manufacture within the meaning of 35 U.S.C. 101. It is clearly not a series of steps or acts to be a process nor is it a combination of chemical compounds to be a composition of matter. As such, they fail to fall within a statutory category. It is at best, function descriptive material per se. The language of the claim fail to declare that the “computer-readable medium causing a computer to execute instructions” after storing the instructions in computer-readable medium that the courts have insisted upon.

Descriptive material can be characterized as either “functional descriptive material” or “nonfunctional descriptive material.” Both types of “descriptive material” are non-statutory when claimed as descriptive material per se, 33 F.3d at 1360, 31 USPQ2d at 1759. When functional descriptive material is recorded on some computer-readable medium, it becomes

structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994).

Merely claiming non-functional descriptive material, i.e., abstract ideas, does not make it statutory. See *Diehr*, 450 U.S. at 185-86, 209 USPQ at 8 (noting that the claims for an algorithm in *Benson* were unpatentable as abstract ideas because “[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer.”). See MPEP 2106.01 [R-6].

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4, 13-15, 23-25, and 27-29 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: encrypting the message first before the decrypting the message. Applicant Claimed system and method for encrypting/decrypting which is not clear. Examiner assumed method for public key cryptographic system.

### ***Drawings***

The subject matter of this application discuss of illustration by drawing examples to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37

CFR 1.81(c). No new matter may be introduced in the required drawing. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

### *Claim Objections*

Claim 16 is objected to because of the following informalities: Typing error at last line. "M;" should be "M.". Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Takagi et al. (U.S. Patent 6,396,926 B1).

1. Regarding Claim 1, Takagi teach and describe a system for encrypting/decrypting messages, comprising: a public key cryptosystem having a predetermined number of prime factors used for the generation of a modulus N and an exponent e; wherein a proper subset of the prime factors of the modulus N, along with the exponent e, are required to decrypt messages that are encrypted using the public exponent e and the public modulus N, where e and N are calculated using RSA methods, and encryption occurs using RSA methods (Fig.1-5, and col.13

line 45 to col.17 line 15).

2. Regarding Claim 2, Takagi teach and describe a method for encrypting/decrypting messages comprising the steps of: providing a public key cryptosystem having a predetermined number of prime factors used for the generation of a modulus  $N$  and an exponent  $e$ ; wherein a proper subset of the prime factors of the modulus  $N$  are required to decrypt messages that are encrypted using the public exponent  $e$  and the public modulus  $N$ , where  $e$  and  $N$  are calculated using RSA methods, and encryption occurs using RSA methods (Fig. 1-5, and col.13 line 45 to col.17 line 15)..
3. Regarding Claim 3, Takagi teach and describe a method for encrypting/decrypting messages comprising the steps of: Encrypting a plaintext message  $M$  into a ciphertext message  $C$  using any method that produces a value equivalent to  $C = M \cdot e \pmod N$ , where  $0 < M < N$ , such that the ciphertext  $C$  can be decrypted into the plaintext message  $M$  using only  $e$  and the prime factors of  $N$ ,  $N$  being the product of all of the numbers in the set  $S$ ;  $S$  being a set of at least two prime numbers,  $p_1 \dots p_k$ , where  $k$  is an integer greater than 1;  $e$  being a number;  $S_d$  being a proper subset of  $S$ ;  $N_d$  being the product of all of the numbers in the set  $S_d$  (Fig. 1-5, and col.13 line 45 to col.17 line 15).
4. Regarding Claim 5, Takagi teach and describe a method for decrypting encrypted messages comprising the steps of: determining if a derived modulus  $N_d$  is a squarefree number, and if so, decrypting ciphertext  $C$  into message  $M$  using any method that produces a

value equivalent to  $M = C \cdot \text{sup.d} \bmod N \cdot \text{sub.d}$ , where  $d$  is generated using the following steps:  
calculating the number  $Z \cdot \text{sub.d}$  as the product of each prime factor of  $N \cdot \text{sub.d}$  minus 1,  
 $(N \cdot \text{sub.d}_1 - 1) * \dots * (N \cdot \text{sub.d}_j - 1)$  for prime factors of  $N \cdot \text{sub.d}$  1 to  $j$ , where  $j$  is the number of prime factors in  $N \cdot \text{sub.d}$ ; generating the exponent  $d$  such that the following relationship is satisfied:  
 $e * d = 1 \bmod Z \cdot \text{sub.d}$  (Fig. 1-5, and col.13 line 45 to col.17 line 15).

5. Regarding Claim 9, Takagi teach and describe a method for decrypting encrypted messages, comprising the steps of: decrypting the ciphertext message  $C$  to the plaintext message  $M$  by determining if the derived modulus  $N \cdot \text{sub.d}$  is squareful number, and if so; calculating separate decryption exponents  $d \cdot \text{sub.nd}_1 \dots d \cdot \text{sub.nd}_j$  for all distinct prime factors of  $N \cdot \text{sub.d}$  1 to  $j$ , where  $j$  is the number of distinct prime factors in  $N \cdot \text{sub.d}$  so that the following relationship is satisfied for each distinct member of  $N \cdot \text{sub.d}$ :  $e * d \cdot \text{sub.nd}_i = 1 \bmod (N \cdot \text{sub.d}_i - 1)$ ; for each distinct prime factor of  $N \cdot \text{sub.d}$ ,  $N \cdot \text{sub.d}_i$ , calculating a value  $b \cdot \text{sub.d}_i$  as the number of times that  $N \cdot \text{sub.d}_i$  occurs as a prime factor in  $N \cdot \text{sub.d}$ ; calculating  $M \cdot \text{sub.i}$  for each distinct prime factor of  $N \cdot \text{sub.d}$ ,  $N \cdot \text{sub.d}_i$ ; and using all values of  $M \cdot \text{sub.i}$ ,  $N \cdot \text{sub.d}_i$ ,  $d \cdot \text{sub.nd}_i$ , and  $b \cdot \text{sub.d}_i$  to restore the plaintext message  $M$  (Fig. 1-5, and col.13 line 45 to col.17 line 15).

6. Regarding Claim 12, Takagi teach and describe a public key cryptosystem where messages are decrypted using a set of prime numbers  $S$  and the public exponent  $e$ , and messages are encrypted using a modulus  $N \cdot \text{sub.p}$  that is calculated as the product of a set of numbers that is a proper superset of  $S$ , and encryption occurs with standard RSA methods using the public exponent  $e$  and the modulus  $N \cdot \text{sub.p}$  (Fig.1-5, and col.13 line 45 to col.17 line 15).

7. Regarding Claim 13, Takagi teach and describe a method for encrypting/decrypting messages, comprising the steps of: Encrypting a plaintext message  $M$  into a ciphertext message  $C$  using any method that produces a value equivalent to  $C = M^e \bmod N$ , where  $0 < M < N$  such that the ciphertext  $C$  can be decrypted into the plaintext message  $M$  using  $e$  and the prime factors of  $N$  being the product of all of the numbers in the set  $S$ ;  $S$  being a set of at least one prime number,  $p_1 \dots p_k$ , where  $k$  is an integer greater than 0;  $S$  being a proper superset of  $S$ ;  $N$  being the product of all of the numbers in the set  $S$ ;  $e$  being a number (Fig. 1-5, and col. 13 line 45 to col. 17 line 15).

8. Regarding Claim 16, Takagi teach and describe a method for decrypting encrypted messages, including the steps of: Decrypting the ciphertext message  $C$  to the plaintext message  $M$  by: determining if the derived modulus  $N$  is squareful number; if so then, calculating separate decryption exponents  $d_1 \dots d_j$  for all distinct prime factors of  $N$  1 to  $j$ , where  $j$  is the number of distinct prime factors in  $N$  so that the following relationship is satisfied for each distinct member of  $N$ :  $e \cdot d_i = 1 \bmod (N_i - 1)$ ; for each distinct prime factor of  $N$ ,  $N_i$ , calculating a value  $b_i$  as the number of times that  $N_i$  occurs as a prime factor in  $N$ ; calculating  $M_i$  for each distinct prime factors of  $N$ ,  $N_i$ ; and using each value of  $M_i$ ,  $N_i$ ,  $b_i$  and  $d_i$  to restore the plaintext message  $M$  (Fig. 1-5, and col. 13 line 45 to col. 17 line 15)



9. Regarding Claim 19, Takagi teach and describe a method of decrypting encrypted messages, including the steps of: Decrypting the ciphertext message C into the plaintext message M by: determining if the modulus N is a squarefree number; and if so then, decrypting ciphertext C into message M using any method that produces a value equivalent to  $M = C \cdot \text{sup.d} \bmod N$ , where d is generated using the following steps: Calculating the number Z as the product of each prime factor of N minus 1,  $(N.\text{sub.1}-1) \cdot \dots \cdot (N.\text{sub.j}-1)$  for prime factors of N 1 to j, where j is the number of prime factors in N; then generating the decryption exponent d such that the following relationship is satisfied:  $e \cdot d = 1 \bmod Z$  (Fig.1-5, and col.13 line 45 to col.17 line 15).

10. Regarding Claim 23, Takagi teach and describe a method for encrypting/decrypting messages comprising the steps of: Encrypting a plaintext message M into a ciphertext message C using any method that produces a value equivalent to  $C = M \cdot \text{sup.e} \bmod N.\text{sub.p}$ , where  $0 < M < N$ , such that the ciphertext C can be decrypted into the plaintext message M using e and the prime factors of N. N being the product of all of the members of set S; S being a set of at least two numbers,  $p.\text{sub.1} \dots p.\text{sub.k}$  where k is an integer greater than 1 and all members of S are equal to  $p.\text{sub.s}$ , which is a prime number;  $S.\text{sub.p}$  being a superset of S;  $N.\text{sub.p}$  being the product of all of the numbers in the set  $S.\text{sub.p}$ ; e being a number (Fig.1-5, and col.13 line 45 to col.17 line 15).

11. Regarding Claim 26, Takagi teach and describe a method of decrypting encrypted messages, including the steps of: Decrypting the ciphertext message C to the plaintext message M by: Calculating b as the number of times that the number p, occurs as a prime factor in N;

Generating an exponent  $d$  such that the following equation is satisfied:  $e*d \equiv 1 \pmod{(p-1)}$ ; Using Hensel Lifting to transform  $C$  into  $M$  with  $d$ ,  $p$ , and  $b$  as input values (Fig.1-5, and col.13 line 45 to col.17 line 15).

12. Regarding Claim 27, Takagi teach and describe a method for encrypting/decrypting messages, comprising the steps of: Encrypting a plaintext message  $M$  into a ciphertext message  $C$  using any method that produces a value equivalent to  $C = M^{sup.e} \pmod{N.sub.p}$ , where  $0 < M < p$ , such that the ciphertext  $C$  can be decrypted into the plaintext message  $M$  using  $e$  and  $p$   $p$  being a prime number;  $S$  being a set containing only the number  $p$ ;  $S.sub.p$  being a superset of  $S$ ;  $N.sub.p$  being the product of all members of the set  $S.sub.p$ ;  $e$  being a number (Fig.1-5, and col.13 line 45 to col.17 line 15).

13. Regarding Claim 30, Takagi teach and describe a method for decrypting encrypted messages, comprising the steps of: Decrypting using any method that produces a value equivalent to as  $M = C^{sup.d} \pmod{p}$ , where  $d$  is generated using the following step: Calculating  $d$  such that the following equation is satisfied:  $e*d \equiv 1 \pmod{(p-1)}$ - (Fig.1-5, and col.13 line 45 to col.17 line 15).

13. Regarding Claim 31, Takagi teach and describe a method for establishing cryptographic communications, comprising the steps of: calculating a composite number  $N$ , which is formed from the product of distinct prime numbers  $S$ ,  $p.sub.1, \dots p.sub.k$  where  $k \geq 1$ . Encoding a plaintext message  $M$ , to a ciphertext  $C$ , where  $M$  corresponds to a number representative of a

message and  $0 < \text{length}(M) < S$ ; generating an exponent  $e$ ; transforming said plaintext,  $M$ , into said ciphertext,  $C$ , where  $C$  is developed using any method that produces a value equivalent to  $C = M^e \bmod N$ , such that ciphertext  $C$  can be decrypted into plaintext  $M$  using only  $e$  and  $S$  (Fig. 1-5, and col. 13 line 45 to col. 17 line 15).

14. Regarding Claim 34, Takagi teach and describe a method for decrypting encrypted messages, comprising the steps of: decoding the ciphertext message  $C$  to the plaintext message  $M$ , wherein said decoding comprises the step of: transforming said ciphertext message  $C$  to plaintext  $M$ , using any method that produces a value equivalent to  $M = C^d \bmod S$ , where  $d$  is generated using the following step: generating  $d$  such that  $e \cdot d \equiv 1 \bmod (S-1)$  (Fig. 1-5, and col. 13 line 45 to col. 17 line 15).

15. Regarding Claim 35, Takagi teach and describe a system for encrypting and decrypting electronic communications including a network of computers and/or computer-type devices, such as personal data assistants (PDAs), mobile phones and other devices, in particular mobile devices capable of communicating on the network; generating at least one private key and at least one public key, wherein the at least one private key is determined based upon any one of a multiplicity of prime numbers that when multiplied together produce  $N$ , which is the modulus for at least one of the public keys (Fig. 1-5, and col. 13 line 45 to col. 17 line 15).

16. Regarding Claim 36, Takagi teach and describe a method for public key decryption where less than all of the distinct prime factors of a number  $N$  are used to decrypt a ciphertext

message C into plaintext message M, where encryption occurs with the public key  $\{e, N\}$  using any method that produces a value equivalent to  $C = M \cdot e \bmod N$  (Fig.1-5, and col.13 line 45 to col.17 line 15).

17. Regarding Claim 37, Takagi teach and describe a method for public key encryption with a public key  $\{e, N\}$  where a plaintext message M is encrypted into a ciphertext message C using any method that produces a value equivalent to  $C = M \cdot e \bmod (N \cdot X)$ , where N is the public modulus and X is any integer greater than 1 (Fig.1-5, and col.13 line 45 to col.17 line 15).

18. Regarding Claim 38, Takagi teach and describe a method for public key decryption of a message that has been encrypted with the public key  $\{e, N\}$  where a ciphertext message C is decrypted into a plaintext message M using any method that produces a value equivalent to  $M = C \cdot d \bmod N$ , where N is the product of less than all of the prime factors of the public modulus N and d satisfies the equation  $e \cdot d \equiv 1 \bmod Z$ , where Z is the product of each of the k prime factors of N minus 1,  $(p_1 - 1) \cdot \dots \cdot (p_k - 1)$  (Fig.1-5, and col.13 line 45 to col.17 line 15).

19. Regarding Claim 39, Takagi teach and describe a method for public key decryption of a message that has been encrypted using any method that produces a value equivalent to  $C = M \cdot e \bmod N$ , where a ciphertext message C is decrypted into a plaintext message M using any method that produces a value equivalent to  $M = C \cdot d \bmod N$ , where N is the product of less than all of the prime factors of the public modulus N and d satisfies the equation

$e \cdot d = 1 \bmod Z$ , where  $Z$  is the product of each of the  $k$  prime factors of  $N_{\text{sub}.d}$  minus 1,  $(p_{\text{sub}.1} - 1) \cdot \dots \cdot (p_{\text{sub}.k} - 1)$  (Fig.1-5, and col.13 line 45 to col.17 line 15).

20. Claims 4, 6-8, 10-11, 14-15, 17-18, 20-22, 24-25, 28-30, and 32-33 are rejected applied as above rejecting Claims, 3, 5, 9, 13, 19, 27, and 31. Furthermore, Takagi teach and describe a public key cryptographic system and method wherein:

As per Claim 4, the step of generating the exponent  $e$  includes calculating the exponent  $e$  as a number that is relatively prime to the product of each distinct prime factor of  $N$  minus 1,  $(N_{\text{sub}.1} - 1) \cdot \dots \cdot (N_{\text{sub}.j} - 1)$  for distinct prime factors of  $N$  1 to  $j$ , where  $j$  is the number of distinct prime factors in  $N$ , or choosing the exponent  $e$  as a small prime number (col.9 line 5 to col.11 line 45).

As per Claim 6, further including the step of: directly calculating  $M = C_{\text{sup}.d} \bmod N_{\text{sub}.d}$  ((col.9 line 5 to line 65).

As per Claim 7 further including the steps of: calculating separate decryption exponents  $d_{\text{sub}.nd1} \dots d_{\text{sub}.ndj}$  for all prime factors of  $N_{\text{sub}.d}$  1 to  $j$ , where  $j$  is the number of prime factors in  $N_{\text{sub}.d}$  so that the following relationship is satisfied for each member of  $N_{\text{sub}.d}$ :  $e \cdot d_{\text{sub}.ndi} = 1 \bmod (N_{\text{sub}.di} - 1)$ ; and performing decryptions of the form  $M_{\text{sub}.i} = C_{\text{sup}.d} \cdot d_{\text{sub}.ndi} \bmod N_{\text{sub}.di}$  for all prime factors of  $N_{\text{sub}.d}$  from 1 to  $j$ , where  $j$  is the number of prime factors in  $N_{\text{sub}.d}$ , and then using the values of each  $M_{\text{sub}.i}$  and  $N_{\text{sub}.di}$  to reconstruct  $M$  (col.9 line 5 to col.11 line 45).

As per Claim 8, the values of each  $M_{sub,i}$  and  $N_{sub,di}$  restore the plaintext message  $M$  using the Chinese Remainder Theorem and/or Garner's algorithm (col.9 line 5 to col.11 line 45).

As per Claim 10, further including the steps of: using Hensel Lifting to calculate  $M_{sub,i}$  for each distinct prime factor of  $N_{sub,d}$ ,  $N_{sub,di}$  (col.9 line 5 to line 65).

As per Claim 11, further including using techniques such as the Chinese Remainder Theorem and/or Garner's algorithm to use all value of  $M_{sub,i}$ ,  $N_{sub,di}$ ,  $d_{sub,ndi}$ , and  $b_{sub,di}$  to restore the plaintext message  $M$  (col.9 line 5 to col.11 line 45).

As per Claim 14, the step of generating the exponent  $e$  includes calculating the exponent  $e$  as a number that is relatively prime to the product of each distinct prime factor of  $N_{sub,p}$  minus 1,  $(N_{sub,p-1}) * \dots (N_{sub,pj-1})$  for distinct prime factors of  $N_{sub,p}$  1 to  $j$ , where  $j$  is the number of distinct prime factors in  $N_{sub,p}$  (col.9 line 5 to col.11 line 45).

As per Claim 15, the step of generating the exponent  $e$  includes choosing the exponent  $e$  as a small prime number (col.3 line 46 to 4 line 14).

As per Claim 17, where Hensel Lifting is used to calculate  $M_{sub,i}$  for each distinct prime factor of  $N$ ,  $N_{sub,i}$  (col.9 line 5 to col.11 line 45)..

As per Claim 18, further including using techniques such as the Chinese Remainder Theorem and/or Garner's algorithm to use all value of  $M_{sub,i}$ ,  $N_{sub,i}$ ,  $d_{sub,ni}$ , and  $b_{sub,i}$  to restore the plaintext message  $M$  (col.9 line 5 to col.11 line 45).

As per Claim 20, further including the step of: directly calculating  $M = C_{sup,d} \bmod N$  (col.9 line 5 to col.11 line 45).

As per Claim 21, further including the steps of: calculating separate decryption exponents  $d_{sub,1} \dots d_{sub,j}$  for all prime factors of  $N$  1 to  $j$ , where  $j$  is the number of prime factors in  $N$  so

that the following relationship is satisfied for each member of  $N$ :  $c \cdot d_{\text{sub},i} \equiv 1 \pmod{(N_{\text{sub},i}-1)}$ ; and performing decryptions of the form  $M_{\text{sub},i} = C_{\text{sup},\text{sub},di} \pmod{N_{\text{sub},i}}$  for all prime factors of  $N$  from 1 to  $j$ , where  $j$  is the number of prime factors in  $N$ , and then using the values of each  $M_{\text{sub},i}$  and  $N_{\text{sub},i}$  to reconstruct  $M$  (col.9 line 5 to col.11 line 45).

As per Claim 22, the values of each  $M_{\text{sub},i}$  and  $N_{\text{sub},i}$  reconstruct  $M$  using the Chinese Remainder Theorem and/or Garner's algorithm (col.9 line 5 to col.11 line 45).

As per Claim 24, the step of generating the exponent  $e$  further includes: Calculating the exponent  $e$  as a number that is relatively prime to the product of all of the distinct prime factors of  $N_{\text{sub},p}$  minus 1,  $(N_{\text{sub},p}-1) \cdot \dots \cdot (N_{\text{sub},pj}-1)$  for distinct prime factors of  $N_{\text{sub},p}$  1 to  $j$ , where  $j$  is the number of distinct prime factors in  $N_{\text{sub},p}$  (col.9 line 5 to col.11 line 45).

As per Claim 25, the step of generating the exponent  $e$  includes choosing the exponent  $e$  as a small prime number (col.3 line 46 to 4 line 14).

As per Claim 28, the step of generating the exponent  $e$  further includes: Calculating the exponent  $e$  as a number that is relatively prime to the product of each distinct prime factor of  $N_{\text{sub},p}$  minus 1,  $(N_{\text{sub},p1}-1) \cdot \dots \cdot (N_{\text{sub},pj}-1)$  for distinct prime factors of  $N_{\text{sub},p}$  1 to  $j$ , where  $j$  is the number of distinct prime factors in  $N_{\text{sub},p}$  (col.9 line 5 to col.11 line 45).

As per Claim 29, the step of generating the exponent  $e$  includes choosing the exponent  $e$  as a small prime number (col.3 line 46 to 4 line 14).

As per Claim 32, the step of generating the exponent  $e$  further includes: Calculating the exponent  $e$  as a number that is relatively prime to the product of each distinct prime factor of  $N$  minus 1,  $(N_{\text{sub},1}-1), \dots, (N_{\text{sub},j}-1)$  for distinct prime factors of  $N$  1 to  $j$ , where  $j$  is the number of distinct prime factors in  $N$  (col.9 line 5 to col.11 line 45).

As per Claim 33, the step of generating the exponent  $c$  includes choosing the exponent  $c$  as a small prime number (col.3 line 46 to 4 line 14).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SYED ZIA whose telephone number is (571)272-3798. The examiner can normally be reached on 9:00 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on 571-272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Sz  
September 19, 2008  
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